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09/997,081	11/28/2001	John Charles Clark	57255US002	6096

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EXAMINER	
MAYEKAR, KISHOR	

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Please find below and/or attached an Office communication concerning this application or proceeding.

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/997,081
Filing Date: November 28, 2001
Appellant(s): CLARK ET AL.

Philip Y. Dahl
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed May 10, 2005.

(1) Real Party in Interest

The brief does not contain a statement identifying the Real Party in Interest. Therefore, it is presumed that the party named in the caption of the brief is the Real Party in Interest, i.e., the owner at the time the brief was filed. The Board, however, may exercise its discretion to require an explicit statement as to the Real Party in Interest.

(2) Related Appeals and Interferences

The brief does not contain a statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief. Therefore, it is presumed that there are none. The Board, however, may exercise its discretion to require an explicit statement as to the existence of any related appeals and interferences.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The rejection of claims 1-11 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,554,271	ILLSTON et al.	9-1996
5,840,414	BETT et al.	11-1998

Boccaccini et al. "Use of Electrophoretic Deposition in the Processing of Fibre Reinforced Ceramic and Glass Matrix Composites: A Review", Composites: Part A: Applied Science and Manufacturing, Elsevier Science Publishers, B.V., Amsterdam, NL, Vol. 32, No. 8, August 2001, pp. 997-1006.

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

- Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Boccaccini et al. ("Use of Electrophoretic Deposition in the Processing of Fibre Reinforced Ceramic and Glass Matrix Composites: A Review", Composites: Part A: Applied Science and Manufacturing, Elsevier Science Publishers, B.V., Amsterdam, NL, Vol. 32, No. 8, August 2001, pp. 997-1006) in view of Bett et al. (5,840,414). Boccaccini's invention, a reference cited by Applicant, discloses in the above article a model of Ni-coated carbon fiber reinforced alumina matrix composite by electrophoretic deposition (emphasis added). Boccaccini also

discloses in the abstract that electrophoretic deposition has been used to infiltrate preforms with tight fiber weave architectures using different nanosized ceramic particles of silica and alumina. Boccaccini discloses in the model that the electrophoretic deposition comprises all the steps as claimed wherein the Ni-coated carbon fibers are used as the cathode, the alumina particles possess a net positive surface charge, and the suspension is aqueous (see section 3 in pages 1002-1003). Boccaccini further discloses in Figs. 1 and 4 a case with silica particles wherein the fibers act as the anode and the particles in the suspension are negatively charged. The difference between Boccaccini and the above claims is that Boccaccini is silent on the hydrophilic property of the electrophoretically coated fibers. Bett shows in an invention to a fine pore carbon body that when the pore carbon body is coated with metal oxide particles such as alumina and tin oxide the coated carbon body becomes highly wettable by water (see Disclosure of the Invention) and the coating is by electrophoretic deposition (col. 5, lines 49-52). The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified Boccaccini's teachings as shown by Bett because Bett shows that the fine pores in the carbon body when coated with metal oxide particles whether by electrophoretic deposition

render the coated fine pore carbon body hydrophilic and Boccaccini discloses the electrophoretic coating of the pores of the carbon fibers with particles of alumina or silica. Further, it has been held that "similar processes can reasonably be expected to yield products which inherently have the same properties, *In re Spada* 15 USPQ 2d 1655; *In re DeBlauwe* 222 USPQ 191; *In re Wiegand* 86 USPQ 155.

As to the subject matter of claim 8, Boccaccini discloses in Table 1 an overview of the published work dealing with the application of the electrophoretic deposition technique for the fabrication of fiber reinforced ceramic and glass matrix composites, including carbon fibers and felts. As such, the selection of one type of carbon fibers for another would have been within the skilled of ordinary skill in the art.

- Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Illston et al. (US 5,554,271) in view of Bett '414. Illston's invention is directed to method of manufacturing a composite material of reinforced fibers embedded in a matrix of a ceramic material. Illston discloses that the method comprises the steps of immersing a matt of woven carbon-coated ceramic fibers in a silica sol or an alumina sol as the convenient sol and permeating the fiber matt with charged sol particles by electrophoretic deposition (col. 2, lines 20-44 and

examples). The difference between Illston and the above claims is that Illston is silent on the hydrophilic property of the electrophoretically coated matt. Bett shows in an invention to a fine pore carbon body that when the pore carbon body is coated with metal oxide particles such as alumina and tin oxide the coated carbon body becomes highly wettable by water (see Disclosure of the Invention) and the coating is by electrophoretic deposition (col. 5, lines 49-52). The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified Illston's teachings as shown by Bett because Bett shows that the pores in the carbon body when coated with metal oxide particles whether by electrophoretic deposition render the coated fine pore carbon body hydrophilic and Illston discloses the electrophoretic coating of the pores of the matt with the particles of alumina or silica. Further, it has been held that "similar processes can reasonably be expected to yield products which inherently have the same properties, *In re Spada* 15 USPQ 2d 1655; *In re DeBlauwe* 222 USPQ 191; *In re Wiegand* 86 USPQ 155.

As to the subject matter of claim 8, the substitution of one type of carbon fiber for another would have been within the skilled of ordinary skill in the art as they are both fibers and porous.

(11) Response to Argument

In response to Appellant's argument that none of the cited references teach or suggest claim limitations recited in the rejected claims. To the limitation that none of the references teach or suggest any use of carbon fiber construction where "the carbon fiber construction is the substrate recited in the first step and throughout the method of claim 1, which forms the foundation of the product made by that method, and which renders that product suitable for use as a fuel cell gas diffusion layer", since the use limitation is not stated in the claims, therefore, it is irrelevant whether the references includes this feature or not, and since Boccaccini's Ni-coated carbon fibers and Illston's carbon-coated ceramic fibers being fibers and constructed of carbon as nickel-coated carbon fibers or carbon-coated ceramic fibers, the fibers fit on the disclosure of the invention's carbon fiber construction in lines 24-28 of page 4. Below is an excerpt from the listed website to Toray carbon paper as disclosed in the above disclosure where the Toray carbon paper is either Teflon pretreated or untreated form.

www.fuelcell.com/p_**carbon**cloth.asp

ElectroChem is an authorized distributor of Toray™ carbon paper, which can be used as electrode backing. The carbon paper and carbon cloth can be supplied in either Teflon™ pretreated or untreated form. The pretreated material is hydrophobic and can be directly used for electrode manufacturing. The loading is 35%.

To the limitation of claim 6 that none of the references teach or suggest the use of ZrO_2, since the claim is depended upon claim 1 reciting the metal oxide selected from Type I or Type II, the claim is rejected based on Type I. Further, Boccaccini's Table 1 presents an overview of the published work dealing with the application of the electrophoretic deposition for the fabrication of the fiber reinforced ceramic composites showing in the third row starting from the bottom of page 999 a system of carbon fiber and fiber cloth with a matrix alumina, zirconia and lead zirconate titanate.

To the limitation of claim 7, the carbon fiber construction being a woven carbon construction, Boccaccini discloses that electrophoretic deposition is a novel, simple and inexpensisve method for achieving complete infiltration of tightly woven fiber performs (abstract and paragraph crossing pages 997 and 998). Illston discloses specifically in the examples the use of woven fibers.

To the limitation of claim 8, the carbon fiber construction being a non-woven carbon fiber construction, the substitution of one type of carbon fiber for another would have been within the skilled of ordinary skill in the art as they are both fibers and conductive, as asserted by the examiner. Further, Boccaccini's Table 1

shows a review with the use of carbon fibers and felts. Below is an excerpt from the listed website on felt

encyclopedia.laborlawtalk.com/Non-**woven**

Non-woven textiles are those which are neither woven nor knit, for example felt. Non-wovens are typically not strong (unless reinforced by a backing), and do not stretch. They are cheap to manufacture.

Non-woven fabric is manufactured by putting small fibers together in the form of a sheet and then binding them either mechanically (as in the case of felt), with an adhesive, or by interlocking them with serrated needles such that the inter-fiber friction results in a strong fabric.

To the limitations of claims 10 and 11, the wicking property of the hydrophilic carbon fiber construction, since Boccaccini or Illston discloses the electrophoretic deposition of particles of alumina or silica on fibers whether carbon fibers or carbon coated fibers and Bett shows when the fine pore of a carbon body is coated with metal oxide particles, the particles imparts wettability to the coated carbon body, the coated fibers of either Boccaccini or Illston possesses the recited wicked ability, as it has been held that "similar processes can reasonably be expected to yield products which inherently have the same properties, *In re Spada* 15 USPQ 2d 1655; *In re DeBlauwe* 222 USPQ 191; *In re Wiegand* 86 USPQ 155.

In summary, since the primary reference, either Boccaccini or Illston, discloses all the steps as claimed except for the hydrophilic property of the

electrophoretic coated fibers and since the secondary reference, Bett, suggests that when a porous carbon body is coated whether electrophoretic deposition with metal oxide particles the coated fine porous carbon body becomes highly wettable by water, it is clear that when the primary reference's fibers are coated with particles of alumina or silica, the particles impart hydrophilic to the coated fibers. As such the prima facie case of obviousness has been established.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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KM
July 21, 2005

Conferees
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